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Quarterly Report – Public Page

For Period Ending: March 27, 2011

Contract Number: DTPH56-09-T-000003

Prepared for: United States Department of Transportation
Pipeline and Hazardous Materials Safety Administration
Office of Pipeline Safety

Project Title: "Determine New Design and Construction Techniques for Transportation of Ethanol and Ethanol/Gasoline Blends in New Pipelines, #394"

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Background

This project address ethanol gaps identified at The Safe & Reliable Ethanol Transportation & Storage Technical Road Mapping Workshop held in Dublin, Ohio in October 2007. Several key areas are addressed which directly support the PHMSA mission for public safety, including: Safety of Transporting Blends Containing More than 10 Percent Ethanol (Requirements for pipelines to handle FGE – E95); Phenomenological Understanding of Ethanol SCC (Understanding and Use of metallurgical, welding and surface treatments to mitigate SCC). The project will improve pipeline safety by supplying key information necessary to address gaps in industry and regulatory knowledge for the design and construction of ethanol and ethanol/gasoline blend pipelines.

The objectives of the project are:

1. Develop supporting data, related analysis and recommendations for cost-effective design and construction methods for reducing the effects of eSCC that can be implemented in new pipeline systems to allow safe and efficient transportation of Fuel Grade Ethanol (FGE).
2. Evaluate design aspects for control and monitoring of oxygen uptake and internal corrosion for pipelines transporting FGE
3. Recommend the most advantageous direction for expanded and improved pipeline design and testing standards for operations involving exposure to FGE

Progress in the Quarter

Colonial Pipeline has found the final exotic pipe, B8, and has begun the procurement process. They should know the delivery schedule in the next quarter.

Technical Results and Conclusions

Honeywell conducted an initial analysis of the residual stress measurement results provided by EWI on the pipeline girth welds fabricated for Task 1.2, aimed at evaluating alternating welding methods. The results from the analyses have been provided in this report. The project team is currently conducting a more in-depth analysis of the residual stresses data obtained in Task 1.2 in order to thoroughly investigate the effect of the welding techniques used in this investigation. The team will publish results from this analysis in future monthly and quarterly.

The project team conducted a detailed analysis of the residual stress measurement results provided by EWI on the expanded (B1, B2 and B3) and non-expanded (B4, B5, B6 and B7) pipes, a part of Task 1.4. The Honeywell and EWI held a teleconference to further discuss the results from analyses. The results obtained indicated that the residual stress values were in the range expected for the tested pipes and the peak residual stresses were in general higher for the non-expanded pipes (B4, B5, B6 and B7). The results aligned with a general theory[4] that expansion of pipe during production would result in lower residual stresses due to reduction of internal stresses as a result of the expanding operation.

The Honeywell team also conducted further analyses of the residual stress results under Task 1.4 to identify the stress levels they will use for the C-SSR testing. After detailed discussions the team agreed that the stress levels they will use for the C-SSR testing will be based on the highest

total stress obtained for the pipe group (expanded/non-expanded), determined based on a combination of the max effective Von Mises stresses and the maximum pipe operating stresses.

Honeywell has received the shot peened SSR tensile samples from EWI required for the evaluation of the surface treatment effects as proposed under Task 1.3. Honeywell will test the specimens using the conventional SSR method with a monotonically increasing strain to failure (as used in Task 1.1 of the program). The project team also decided the approach for the coating (active metal and polymeric coatings) of the SSR specimens for Task 1.4, as discussed earlier in the report.

The project team decided the testing approach they will use for the monitoring tasks (Task 2.1-Dissolved Oxygen Monitoring and Task 2.2-Internal Corrosion Monitoring). Honeywell has received the dissolved oxygen probe from Polestar technologies and is currently conducting the initial calibration of the probe in synthetic fuel grade ethanol (SFGE). Honeywell has initiated procurement of the required specimens for the internal corrosion monitoring.

Issues, Problems or Challenges

The team has found the final exotic pipe B8 and Colonial Pipeline is in the process of procuring it. Although the team believes the overall project schedule will not be affected by the delay in receiving the pipes, they will know more details once the shipment schedule on the pipe B8 is known.

Plans for Future Activity

Over the next quarterly reporting period the following activities will be undertaken:

- The project team will conduct detailed analysis of the residual stress results obtained in Task 1.2 and determine the testing parameters to be utilized for C-SSR testing as proposed under this task.
- Honeywell will machine test specimens from weld pipe sections received from EWI, as part of the evaluations under Task 1.2 and 1.4. Honeywell will initiate the C-SSR testing on machined samples for both Task 1.2 and 1.4.
- Honeywell will complete machining of SSR tensile specimens required for Task 1.3 and will initiate coating of the specimens with the active metal and polymeric coatings. Honeywell will also initiate the C-SSR testing on machined samples.
- Honeywell will conduct initial calibration of the Polestar dissolved oxygen probe in ethanol.
- Honeywell will complete the procurement of all probes required for Task 2.1 (dissolved oxygen monitoring) and order specimens required for Task 2.2 (internal corrosion study).